

## monkey business

A COLLABORATION BETWEEN THE VIRGINIA DEPARTMENT OF HEALTH, VIRGINIA DEPARTMENT OF GAME AND INLAND FISHERIES, AND THE VIRGINIA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

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Nonhuman primates (NHP) may be possessed and sold in the Commonwealth of Virginia; however, they may not be liberated within the state. Nonhuman Primates are subject to all applicable local, state, and federal laws and regulations, including those that apply to threatened /endangered species, yet the government has limited knowledge of these animals when they are privately kept as pets. As a result, local health departments and animal control officers often learn about a pet NHP after the animal has bitten or injured a person.

Injuries caused by NHPs require special attention because of the potential for fatal and rare zoonoses, severe injuries and serious wound-related infections. When investigating an exposure from a NHP, you should obtain the following information:

- What was the type of exposure: bite, scratch, etc?
- What type, including species, of primate was involved in the exposure?
- In what type of environment is this primate typically kept?
- Was the animal captive bred in the US?
- Is the animal healthy and acting normally?
- What other animals is the primate exposed to?
- What is the health status of the person that was exposed?

Wounds caused by a NHP should be washed immediately with soap and water and then flushed with water for at least 15 minutes. Eyes or mucus membranes that have been exposed to NHP secretions should be irrigated continuously for at least 15 minutes. The victim should then be assessed by his/her healthcare provider.

The health care provider should contact the local health department if the primate involved:

1. is of the genus *Macaca* (macaques). (The health department may recommend treating the patient for a possible exposure to Herpes B virus in this situation.)
2. was imported into the US from a rabies endemic area
3. was bitten by high risk rabies vector species within the past year
4. was located outside of the country.

If the victim was bitten or exposed to saliva or central nervous system tissue via a mucus membrane or open wound by a high risk primate then the local health department may recommend rabies post-exposure treatment for the victim, or testing of the primate if it is available.

Each situation is unique and should be assessed by your local health department.

The following Zoonotic diseases may be associated with NHPs:

### Rabies

Nonhuman primate rabies is rarely reported in this country and with one exception has always occurred in animals that were recently imported from rabies endemic areas. **Primates may be “vaccinated” for rabies; however, no rabies vaccines are labeled for use in NHPs. Therefore, the HD does not recognize a primate as being vaccinated.**

### B Virus (*Cercopithecine herpesvirus 1*)

Up to 90% of adult macaques can be carriers of B-virus; most are asymptomatic, but some

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can have localized oral lesions. In humans the infection presents as a rapidly ascending encephalomyelitis with a fatality rate of about 70%. Most of the 25 well-documented cases of human infection have occurred in laboratory animal handlers who were somehow directly inoculated with tissue or fluid from a NHP via a bite, scratch, needlestick or laboratory injury. Details on prevention and treatment following exposure to a macaque can be found in “*Recommendations for Prevention of and Therapy for Exposure to B Virus (Cercopithecine Herpesvirus 1)*”. ([www.cdc.gov/ncidod/diseases/bvirus.htm](http://www.cdc.gov/ncidod/diseases/bvirus.htm))

### Tuberculosis (TB)

Nonhuman primates are very susceptible to infection from *Mycobacterium tuberculosis* (TB) and can contract it from humans or other animals. Primates from environments where human TB is prevalent are at the greatest risk for having the disease. Illegally imported monkeys and those raised and sold as pets in the US may not be appropriately tested and could be infected.

### Local Wound Infections

Approximately 224 strains of bacteria have been identified in human and animal saliva-contaminated wounds. The organisms most often encountered in the mouths of rhesus monkeys are the *Neisseria* species, alpha hemolytic streptococci, and *Haemophilus parainfluenza*. In addition, the attending physician should be notified of the possibility of infection with *Eikenella corrodens*, a facultative anaerobe associated with human and nonhuman primate bites that cause extensive tissue damage.

### Enteric Diseases

Enteric diseases are spread via the fecal oral route and cause similar symptoms in humans and nonhuman primates. The more common agents include bacteria (*Shigella*, *Salmonella*, *Campylobacter*), protozoan parasites (*Cryptosporidium*, *Giardia*, *Amoeba*, *Balantidia*), and helminth parasites (*Strongyloides*).

### Simian Immunodeficiency Virus (SIV)

SIV is closely related to HIV-1 and HIV-2 and causes an AIDS-like illness in macaque monkeys; it may be asymptomatic in other species. There have been no reports of human illness, but research workers have developed antibodies to SIV after handling laboratory specimens of SIV.

### Marburg and Ebola (Filoviruses)

Humans have developed illness from Marburg infection when exposed to tissues from African Green monkeys. The Ebola viruses from the Sudan and Zaire have not been isolated from monkeys. A different Ebola virus was discovered in 1995 in West Africa chimpanzees when a researcher became infected. The Ebola virus that caused an outbreak in a Reston, Virginia, monkey quarantine facility did not cause illness in any humans, but four animal handlers developed antibodies to the virus. These incidents remind us of the potential for as-yet undiscovered human pathogens to be introduced by wild-caught monkeys.

### Other

Nonhuman primates are more likely to contract hepatitis A, measles, or poliomyelitis from humans or as part of a laboratory experiment than to transmit these diseases to humans. However, once infected with these diseases, primates pose a risk to the humans with which they are in contact.

# Hybrids as pets

The offspring of domestic dogs or cats bred to wild animals (e.g. wolf hybrids, civet-cat hybrids) and their subsequent generations are considered hybrid animals. The National Association of State Public Health Veterinarians (NASPHV), the American Veterinary Medical Association (AVMA) and other public health and animal welfare groups recommend against maintaining hybrids as pets.

Vaccination of the offspring of domestic dogs or cats bred to wild animals and their subsequent generations may afford some protection against the rabies virus to the animal. However, no rabies vaccine is currently licensed for use in wild animals or in wild-domestic animal hybrids. The vaccination of these animals is considered an extra label use of a biologic because complete rabies vaccine challenge and viral shedding studies have not been conducted with these animals. Therefore, a rabies vaccine certificate issued for a vaccinated hybrid must indicate that the vaccine was used in an extra label manner and identify the animal as a "wolf hybrid" or "civet hybrid".

Since there is no definitive evidence that the vaccine is effective in these animals, canine or feline hybrids that have been previously vaccinated for rabies cannot be recognized as rabies immunized in the event of a human bite or contact with a rabid or suspect rabid animal. When these situations occur the hybrid animal will be considered a "wild animal" and managed accordingly.

When a hybrid animal bites a person, the Virginia Guidelines for Rabies Prevention and Control recommend euthanasia and rabies testing of the hybrid as the safest course of action. While local health directors do have the authority to take possession of a hybrid animal that bites a person, each wolf hybrid situation should be evaluated individually. Reporting animal bites to local public health authorities initiates a number of activities including animal and human health assessments. In regard to hybrid bites, local authorities will gather information including the circumstances surrounding the bite, the age of the bite victim, and the hybrid's history in order to assess the risk to the patient. The health department, in consultation with the bite victim and the physician, then will offer recommendations as to the best course of action.

It is legal to own hybrid animals within the Commonwealth; however, some localities may have ordinances restricting or limiting the ownership of these animals.

## TULAREMIA, PEOPLE AND PETS

Recently, a child in central Virginia was diagnosed with tularemia. While not commonly reported in Virginia, tularemia is a potentially serious illness that occurs naturally in the US. It is caused by *Francisella tularensis* which circulates among many wild animals and can infect domestic animals as well.

*Francisella tularensis* is a non-sporulating gram negative coccobacillus that can survive for weeks or months in a moist environment. Sheep are the primary domestic animal host; however, dogs, cats, pigs and horses are susceptible to clinical infections as well. Cottontail rabbits, hares, beavers, muskrats, and meadow voles are important wild animal hosts.

Animals and people can be exposed to *F. tularensis* through inhalation of infective aerosols, bites from infected arthropods, and ingestion of or direct contact with contaminated meat, water, soil or vegetation. Depending on the route of exposure, tularemia may cause skin ulcers, swollen and painful lymph glands, inflamed eyes, a sore throat, oral ulcers, intestinal pain or a pneumonia-like illness in humans. Early symptoms almost always include the abrupt onset of fever, chills, headache, muscle aches, joint pain, dry cough and progressive weakness. The mortality rate for most naturally transmitted cases of tularemia is low.

## TULAREMIA, PEOPLE AND PETS.... CONTINUED

Tularemia is seen most often in adults in early winter during rabbit hunting season and in children during the summer when there are a lot of ticks and flies. Hunters may be exposed during the early winter, by dressing or eating improperly cooked, infected wild game. The bacterium can survive freezing, so frozen meat has the potential to be infectious for years. The wood tick, Lone-Star tick, dog tick and the deer fly are the primary arthropod vectors.

The symptoms of tularemia may appear anywhere from one to 14 days after exposure, but generally occur within three to five days. The diagnosis of tularemia in humans is usually based upon the clinical presentation of the patient, and then confirmed by a rise in antibody titer. The ELISA-based serological testing for reactivity to *F. tularensis* is highly specific. The bacterium may also be identified through direct examination of secretions, exudates, or biopsy specimens using gram-stain, direct fluorescent antibody, or immunohistochemical stains.

Early treatment of tularemia is recommended. Aminoglycosides are the drugs of choice; however, ciprofloxacin has shown efficacy as well. The antibiotic treatment should last between ten and fourteen days. Patients with tularemia do not need to be isolated, yet contact precautions should be taken when patients have open lesions.

Dogs and cats that are infected with *F. tularensis* may have fever, swollen glands, draining abscesses, mucopurulent ocular and nasal discharge, anorexia and lethargy. Cats seem to be more susceptible to the disease than dogs, and younger animals seem to be more susceptible than older animals. Suspect animals should be handled with care, because bite wounds from infected cats have been associated with human infections. The most commonly used diagnostic tests for animals are the microscopic agglutination method and the indirect fluorescent antibody method. Dogs and cats tend to have lower antibody titers than the titers found in people; however, a fourfold increase in titer confirms active disease. A single titer of 1:160 suggests active disease. Cultures of *F. tularensis* and necropsies on suspect animals should be performed in laboratory with adequate biosafety equipment because the highly infectious aerosolized organisms are a serious hazard to the laboratory worker.

The antibiotic treatment of choice for dogs and cats is parenteral gentamicin. Doxycycline, chloramphenicol, and enrofloxacin may be effective as well; however treatment failure or relapses are more likely to occur with these antibiotics. Tularemia can be prevented in companion animals by protecting them against fleas and ticks and discouraging them from hunting, or eating, rodents or rabbits.

### How can tularemia be prevented?

Wear insect repellent while outside in areas where there are lots of bugs.

Avoid drinking, swimming, or working in untreated water where wild animals are known to be infected.

Use rubber gloves when skinning or handling animals, especially rabbits.

Cook the meat of wild rabbits and rodents thoroughly before eating it.

Discourage children from touching wild rabbits or other potentially infected animals.

Wear proper personal protective equipment and use appropriate containment when working with tularemia in a laboratory setting.

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